

**DISPLACEMENT-SENSITIVE PHOTONIC CRYSTAL STRUCTURES BASED ON
GUIDED RESONANCE IN PHOTONIC CRYSTAL SLABS**

ABSTRACT OF THE DISCLOSURE

[0072] We introduce a mechanically tunable photonic crystal structure consisting of coupled photonic crystal slabs. Using both analytic theory, and first-principles finite-difference time-domain simulations, we demonstrate that the transmission and reflection coefficients for light normally incident upon such structures can be highly sensitive to nano-scale variations in the spacing between the slabs. Moreover, by specifically configuring the photonic crystal structures, the high sensitivity can be preserved in spite of significant fabrication-related disorders. We expect such a structure to play important roles in micro-mechanically tunable optical sensors and filters.